

Working with water re-use systems



about the author ...

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water re-use systems ...

Quite apart from turning the lawns brown, a record dry June once again turns the spotlight on the need to manage water to avoid both droughts and floods. As will be explained, water re-use systems are a major way of doing this, meaning that plumbers are increasingly likely to come into contact with them, making a basic understanding of how they work a professional necessity. But first, why are they needed?

A quick glance at the chart opposite illustrates the pressures that farmers are already under to obtain the water they need to keep their land productive. The simple solution, increasingly evident in the relatively dry south of England, is to store the plentiful winter rain in farm-level reservoirs, for subsequent re-use during the dry summer months.

An important secondary effect of doing this, is that the reservoirs can also help mitigate downstream flooding risks. This is achieved by including spare capacity in the design to use as a temporary store for water during peak weather events. This spare water can then be slowly released at a rate that can be coped with by the local drainage infrastructure.

in towns & cities ...

In the urban environment the same principles apply, and are often used as part of the sustainable drainage arrangements on new developments. This recognises that a growing population will increase pressures on already stressed water supplies, and will also need more homes and jobs. The associated

developments therefore need to avoid adding to downstream flood risks, and be as water-consumption efficient as possible.

Both these requirements can be met by “harvesting” the rain falling on the development, for subsequent re-use for non-potable applications such as toilet-flushing. Typically, this reduces domestic mains-water to around 60% of Building Regulation requirements, and can result in even larger savings in commercial buildings with large roofs and a high demand for non-potable water.

As with the farm-level reservoirs, the cisterns storing the water for subsequent re-use need to incorporate spare (attenuation) capacity to play their role in mitigating down-stream flood risks. Unlike the

farmer’s reservoir, their storage capacity can be much more limited, as water is being used regularly, rather than only in the summer months.

tricks of the trade ...

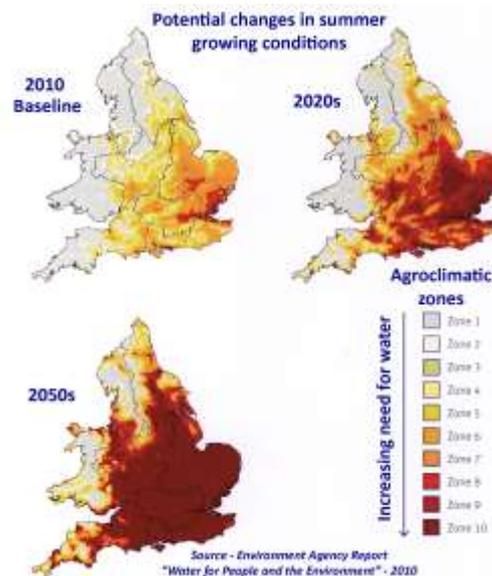
The types of large water re-use systems expected to be found in commercial premises are likely to be supported by their manufacturers or installers, and be covered by maintenance contracts. Users of domestic systems, however, are much more likely to call upon their regular domestic

plumber for assistance, and may not themselves be very familiar with their own system.

Plumbers sharing this lack of familiarity, might well find it useful to spend a few minutes looking at the UKRMA training manual (free download on the Association’s website) time well spent. Failing that, a basic understanding of how systems work, and how they can go wrong, is a good place to start.

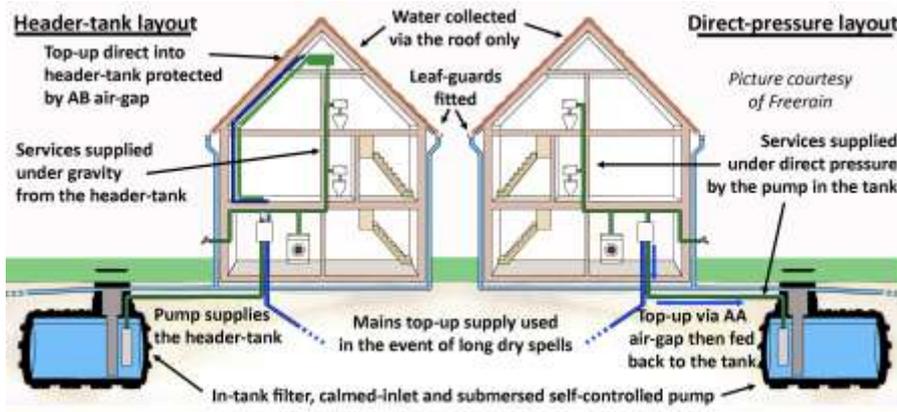
how rainwater harvesting systems work ...

Both domestic and commercial systems work on one or other of the principles shown in the schematic illustration. Both systems gather roof water (never groundwater) via standard guttering and downpipes, filtering the water before it is delivered into the storage cistern. The storage cisterns are sized according to the roof area and occupancy of the



building concerned, to provide around 20-days consumption in dry weather when full.

The stored water is then delivered through dedicated non-potable pipework to services, typically the toilets, clothes-washing machine and garden tap, either direct from the storage cistern



under pump-pressure, or are gravity-fed via a header-tank in the loft. An essential requirement, therefore, is that there must be water available at all times in the storage cistern for direct-pressure systems to work, or in the header-tank for gravity-fed systems.

This is achieved on the direct-pressure systems by a float-valve in the main storage tank sensing when more water is need, during prolonged dry spells for example, and automatically providing a top-up supply of mains water via a Type AA air-gap. A similar arrangement ensures that there is always water available in header-tank systems by introducing a supply of mains-water directly into the header-tank via a Type AB air-gap when supply from the main storage cistern is exhausted.

faults analysis ...

Rainwater harvesting systems are very durable, being built to give decades of reliable service. However, in the event of a malfunction the first check that needs to be made is whether the system is header-tank or direct-pressure. An obvious indicator of the latter is the presence of a control panel that includes a Type AA air-gap, but if in doubt, always ring the manufacturer for advice.

The most likely causes of a direct-pressure system ceasing to work include lack of water in the main

storage cistern, caused by the need to clean the inlet filter (if there has been plenty of rain), or a top-up failure if the weather has been dry. The system will also not function in the event of an electrical power failure, or in the event of a pump failure.

Gravity-fed header-tank systems will continue to work notwithstanding any of the above issues, which for most purposes is a “good thing”; however, it may mask the fact that the system is operating permanently using mains top-up water, making it vital that end-user is aware of the manufacturer’s indicator for this.

helping avoid future floods & droughts ...

Any plumber who has yet to visit a property fitted with a water re-use system, should expect to do so soon as they become a more regular part of the UK’s sustainability armoury.

Many new developments are required to fit them as part of their Planning Consent, and far-sighted developers are recognising they can play a highly cost-effective role in helping to meet sustainable drainage requirements. Water re-use also delivers the unique benefit of helping to avoid both floods and droughts in a single integrated system.



From the plumbing trade point of view, just two golden rules need to be remembered; if in doubt, don’t hesitate to ring the system manufacturer who will be only too pleased to advise on the specifics of their system; and, *never ever* install a cross-connection between the potable and non-potable supplies pipework, which is illegal and dangerous.

For further information, or to download a free training manual, visit www.ukrma.org